REMARKS

The last Office Action of November 1, 2006 has been carefully considered. Reconsideration of the instant application in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 1-10 are pending in the application. No amendment to the claims and specification has been made.

Claim Rejections under 35 U.S.C. §112

The rejection of claims 1-10 under 35 U.S.C. §112, second paragraph, is hereby traversed.

1) The examiner rejected "in the event of" as lacking antecedent basis. In the English language, the term "in the event of" is an alternate expression for "if" and does not require antecedent basis. It does not refer to a specific event. This rejection is unreasonable and absurd, and the USPTO has granted 37,568 patents with the qualifier "in the event of" for "if" in the claims.

2) The phrase "so as to" does not render the claim indefinite. Again, the commonly accepted meaning of "so as to" in the English language expresses a consequence of an action. Claims 9 and 10 could alternatively have been drafted to read "thereby short-circuiting" instead of "so as to short-circuit." Moreover,

"If the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement, a rejection of the claim under 35 U.S.C. 112, second paragraph, would be appropriate. See *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993). However, if the language used by applicant satisfies the statutory requirements of 35 U.S.C. 112, second paragraph, but the examiner merely wants the applicant to improve the clarity or precision of the language used, the claim must not be rejected under 35 U.S.C. 112, second paragraph, rather, the examiner should suggest improved

language to the applicant." (MPEP 2173.02)

It appears that the examiner deviates in her interpretation of the English-language sentence structure from commonly accepted meanings. The rejection contravenes the examiner's examination guidelines under MPEP 2173.02, and withdrawal of this rejection is requested.

Claim Rejections under 35 U.S.C. §103

Claims 1-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mori (US 5,333,706) in view of Yamada et al. (US 6,213,571) and further in view of Shin et al. (US 6,531,839).

This rejection is hereby respectfully traversed for the following reasons.

The present invention, as recited in claim 1, is directed to a drive control system for braking an electric motor, with an integrated armature short-circuit brake having a first delay time, a mechanical brake having a second delay time which is longer that the first delay time, and a controller simultaneously applying a control signal to the integrated armature short-circuit brake and the mechanical brake at an activation time for immediately stopping the electric motor in the event of a malfunction which prevents a controlled slow-down of the electric motor. The armature short-circuit brake is disengaged when a thermal load limit for the electric motor or the controller has been reached.

Claim 6 recites a corresponding method for instantaneously stopping an electric motor powered by a drive system in the event of a malfunction which prevents a controlled slowdown of the electric motor. The method includes the steps of detecting the malfunction, simultaneously applying at an activation time a control signal to an integrated armature short-circuit brake and a mechanical brake, and disengaging the armature short-circuit brake when the electric motor or its control electronics reach a thermal load limit.

Mori discloses a brake apparatus for a vehicle, whereby for achieving a rapid braking action, the disk brake and the electromagnetic brake are activated

simultaneously. (Col. 2, line 16-27 and col. 4, line 60-68). The examiner asserts that Mori disengages the electromagnetic brake when a certain load limit is reached, citing col. 5, lines 11-15: "In STEP 206, when the vehicle speed is equal to or lower than the threshold speed value, the control circuit 12 only outputs a power signal to caliper 16, and therefore only the disc brake (electric actuator 8) is actuated (STEP 209)." Evidently, Mori detects a speed value and not a load limit.

In the section on page 4 of the office action titled "Response to Arguments" the examiner repeats the misguided reasoning from the previous office action. Moreover, the examiner makes confusing statements by asserting that (a) Mori does not teach "disengaging the short circuit brake when the thermal load limit is reached" (page 3, lines 8 and 9 of the final office action; also on page 4 of the first office action, 4th line from bottom); and by then arguing on page 4, lines 4-5 of paragraph 5, that (b) Mori teaches that "the power to the motor is based on speed and that when the speed reaches a lower limit, the short-circuit brake is deactivated." The examiner then asserts that the "thermal load limit" may be a minimum and not necessarily a maximum.

The examiner's interpretation again contravenes the commonly accepted meaning of the English term "load limit." The term "load limit" is commonly used to express a maximum (and not a lesser load) that can be applied to a system or a component of the system. A definition can be found, for example, in the McGraw-Hill Dictionary of Scientific and Technical Terms, 5th edition, page 1158. A copy of this page is attached to this submission. The dictionary definition states:

> **load limit** [CIV ENG] the maximum weight that can be supported by a structure. {MECH ENG] The maximum recommended or permitted overall weight of container or a cargo-carrying vehicle that is determined by combining the weight of the empty container or vehicle with the weight of the load.

Mori therefore does not teach disengaging the armature short circuit brake when a (maximum) thermal load limit is reached, as recited in claim 1. Mori's failure to disclose a (maximum) thermal load limit has been explicitly admitted in

the office action (page 3, lines 7-8), as discussed *supra*. In fact, Mori explicitly states (col. 4, lines 7-19) that "when the vehicle speed decreases below a predetermined value during brake operation, the control circuit 12, which receives a detection signal from the vehicle speed sensor 15, energizes caliper actuator 8 such that only the disc brake (or drum brake) is actuated to produce a brake operation." (Emphasis added).

The office action then asserts that Yamada teaches disengaging the short-circuit brake when a thermal load limit for the electric motor or the controller has been reached. We have previously argued and maintain our position that Yamada does not disclose, teach or suggest anything resembling a thermal load limit for a short-circuit brake.

Yamada discloses a control apparatus for an electric vehicle with an emphasis on achieving a smooth transition between regenerative braking and "plugging" braking. The term "plugging" braking, as it is known in the art, refers to an electric braking operation wherein an electric current is supplied to the motor/generator. Col. 1, lines 56-65, as cited by the examiner, refer to a method, which ensures operation of the control apparatus for electric vehicle to be maintained even if a contact voltage of the regenerative contactor cannot be detected due to failure of its wiring or the like. Yamada detects the absence of a contact voltage of the regenerative contactor during regenerative braking, but does not detect of a thermal load limit.

Shin describes braking a motor with a mechanical brake and an electrical brake, wherein the rotation speed of the motor is first reduced by using a mechanical brake method, whereafter when the rotation speed of the motor drops below a predetermined speed, the motor is stopped using an electrical brake method. Unlike the present invention, which disengages the electromagnetic (short-circuit armature) brake when a thermal load limit is reached, Shin uses the mechanical brake method during the high speed rotation interval to prevent heat occurrence (*but does not detect a thermal load limit*), and thereafter uses the electrical brake method during the relatively low speed interval so that the motor

can be stopped within a short time. (See Shin's Abstract) While Applicant admits that Shin discloses the various delay times fro mechanical and electromagnetic braking, Shin does not disclose a thermal load limit for a short-circuit brake.

The examiner further argues that Applicant applied the arguments against the references individually. This cannot be further from the truth, since at least the limitation recited in claim 1 that "the armature short-circuit brake is disengaged when a thermal load limit for the electric motor or the controller has been reached" is absent from the combination of the references.

The criteria for establishing a *prima facie* case of obviousness are detailed in MPEP 2142-2143. Pursuant to MPEP 2142, "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

Applicant contends that the cited references fail to satisfy the criteria for a *prima facie* case of obviousness. Specifically, Applicant contends that the cited references fail to teach or suggest at least that the "the armature short-circuit brake is disengaged when a thermal load limit for the electric motor or the controller has been reached". Because the combination of references fails to teach or suggest each and every limitation of the claimed invention, the cited references fail to undermine the patentability of the claimed invention.

As to motivation to combine, the Office Action suggests that it would have been obvious to modify the apparatus taught in Mori and Yamada by incorporating the delay times taught by Shin to safely control the braking of the motor, because

power is based on the speed and that mechanical braking has a longer delay than short-circuit braking.

However, these references are not properly combinable. There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998).

Mori teaches disengaging the electromagnetic brake when a lower speed limit has been reached. There is no teaching in Mori to detect a thermal load limit. Motor speed has no relationship whatsoever to a thermal load limit, which refers to a maximum thermal load from short-circuit armature braking, as discussed *supra*. Yamada's braking method operates by entirely different principles, namely by switching from regenerative braking to "plugging" braking. Instead of detecting a thermal load limit, Yamada detects the absence of a contact voltage of the regenerative contactor during regenerative braking. A person skilled in the relevant art would therefore not be motivated to combine Mori and Yamada to solve a problem resulting from a (maximum) thermal load limit of a motor or motor controller during braking with a short-circuit armature, and the combination would also fail to teach or suggest disengaging the armature short-circuit brake when a thermal load limit for the electric motor or the controller has been reached.

There would also be no motivation to combine Shin with Mori and Yamada to solve the problem resulting from a (maximum) thermal load limit of a motor or motor controller during braking with a short-circuit armature, since Shin uses electrical braking at low speed where a maximum thermal load on the electrical brake is not an issue. Moreover, Shin's braking process is performed in the reverse order of the present process, as Shin disengages the mechanical brake when a load limit for the mechanical brake has been reached. Shin, when combined with Mori and Yamada, would therefore not contribute to a solution of the problem resulting from a (maximum) thermal load limit of a motor or motor controller during braking with a short-circuit armature, and the combination would

also fail to teach or suggest disengaging the armature short-circuit brake when a thermal load limit for the electric motor or the controller has been reached.

Thus, these references, whether taken singly or in combination, fail to teach all the elements of claims 1 and 6. Accordingly, the proposed combination cannot render the claimed invention obvious.

Applicant therefore submits that claims 1 and 5 are patentable over the cited US Patents to Mori, Yamada and Shin, as these references, when taken either alone or in combination, fail to teach or suggest the limitations recited in claims 1 and 5. Claims 2-4, which depend from claim 1, and claims 6-10, which depend from claim 5, are then also patentable for at least the reasons that claims 1 and 5 are patentable. Withdrawal of the finality of the rejections and allowance of the pending claims is therefore respectfully requested.

CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate conditions for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Respectfully submitted,

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McGraw-Hill Dictionary of Scientific and Technical Terms

Fifth Edition

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Editor in Chief

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liquid-vapor-contact tower, in which rising vapor lifts or holds falling liquid. [ELEC] The addition of inductance to a transmission line to improve its transmission characteristics throughout a given frequency band. Also known as electrical loading. [ENG] **1.** Buildup on a cutting tool of the material removed in cutting. **2.** Filling the pores of a grinding wheel with material removed in the grinding process. [ENG ACOUS] Placing material at the front or rear of a loudspeaker to change its acoustic impedance and thereby alter its radiation. [MET] Filling of a die cavity with powdered metal. [NUCLEO] Placing fuel in a nuclear reactor. { 'lōd·iŋ }

loading angle [ORD] Angle of elevation specified for loading a particular weapon with its ammunition. { 'lōd·iŋ ˌaŋ·gəl }

loading board [ENG] A device that holds preforms in positions corresponding to the multiple cavities in a compression mold, thus facilitating the simultaneous insertion of the preforms. { 'lōd·iŋ ˌbȯrd }

loading coil [ELECTROMAG] **1.** An iron-core coil connected into a telephone line or cable at regular intervals to lessen the effect of line capacitance and reduce distortion. Also known as Pupin coil; telephone loading coil. **2.** A coil inserted in series with a radio antenna to increase its electrical length and thereby lower the resonant frequency. { 'lōd·iŋ ˌkȯil }

loading density [ENG] The number of pounds of explosive per foot length of drill hole. [ORD] A term applied specifically to explosive charges of projectiles, bombs, warheads, and so on; it is the quantity of explosive per unit volume, usually expressed as grams per cubic centimeter. { 'lōd·iŋ ˌden· səd·ē }

loading device [COMPUT SCI] Equipment from which programs or other data can be transferred or copied into a computer. { 'lōd·iŋ di,vīs }

loading disk [ELECTROMAG] Circular metal piece mounted at the top of a vertical antenna to increase its natural wavelength. { 'lōd·iŋ ˌdisk }

loading head [MECH ENG] The part of a loader which gathers the bulk materials. { 'lōd·iŋ ˌhed }

loading pan [MIN ENG] A box or scoop into which broken rock is shoveled in a sinking shaft while the hoppit is traveling in the shaft. { 'lōd·iŋ ˌpan }

loading program [COMPUT SCI] Program used to load other programs into computer memory. Also known as bootstrap program. { 'lōd·iŋ ˌprō·grəm }

loading rack [ENG] The shelter and associated equipment for the withdrawal of liquid petroleum or a chemical product from a storage tank and loading it into a railroad tank car or tank truck. { 'lōd·iŋ ˌrak }

loading routine *See* input routine. { 'lōd·iŋ rü,tēn }

loading space [ENG] Space in a compression mold for holding the plastic molding material before it is compressed. { 'lōd·iŋ ˌspās }

loading station [MECH ENG] A device which receives material and puts it on a conveyor; may be one or more plates or a hopper. { 'lōd·iŋ ˌstā·shən }

loading tray [ENG] A tray with a sliding bottom used to simultaneously load the plastic charge into the cavities of a multicavity mold. [ORD] **1.** Trough-shaped carrier on which heavy projectiles are placed so that they can be more easily and safely slipped into the breech of a gun. **2.** Hollowed slide which guides the projectiles into the breech of some types of automatic weapons. { 'lōd·iŋ ˌtrā }

loading weight [ENG] Weight of a powder put into a container. { 'lōd·iŋ ˌwāt }

load isolator [ELECTROMAG] Waveguide or coaxial device that provides a good energy path from a signal source to a load, but provides a poor energy path for reflections from a mismatched load back to the signal source. { 'lōd ˌī·səˌlād·ər }

load leveling [ELEC] A method for reducing the large fluctuations that occur in electricity demand, for example by storing excess electricity during periods of low demand for use during periods of high demand. { 'lōd ˌlev·ə·liŋ }

load limit [CIV ENG] The maximum weight that can be supported by a structure. [MECH ENG] The maximum recommended or permitted overall weight of a container or a cargo-carrying vehicle that is determined by combining the weight of the empty container or vehicle with the weight of the load. { 'lōd ˌlim·ət }

load line [ELECTR] A straight line drawn across a series of tube or transistor characteristic curves to show how output signal current will change with input signal voltage when a specified load resistance is used. [NAV ARCH] A line, Pain… the outside of a ship, which marks the maximum w… the ship is loaded with the greatest cargo which … safely. { 'lōd ˌlīn }

load loss [ELEC] The sum of the copper loss of a … due to resistance in the windings, plus the eddy cu… the winding, plus the stray loss. { 'lōd ˌlȯs }

load metamorphism *See* static metamorphism. { … ə'mȯr,fiz·əm }

load module [COMPUT SCI] A program in a form… loading into memory and executing. { 'lōd ˌmäj… }

load oil [PETRO ENG] Oil used as a fracturing flu… mation to stimulate a well to produce. { 'lōd ˌȯil }

load point [COMPUT SCI] Preset point on a magneti… which reading or writing will start. { 'lōd ˌpȯint }

load power [ELEC] Of an energy load, the aver… flow of energy through the terminals of that load whe… to a specified source. { 'lōd ˌpaù·ər }

load profile [ENG] A measure of the time distri… building's energy requirements, including the heati… and electrical loads. { 'lōd ˌprō,fīl }

load regulation [ELEC] The maximum change in … voltage or current of a regulated power supply for … change in load conditions. { 'lōd ˌreg·yə,lā·shən }

load shedding [ELEC] A procedure in which … electric power system are disconnected in an attempt … failure of the entire system due to overloading. { … iŋ }

load shifting [ELEC] In an electric power system, … of loads from times of peak demand to off-peak … { 'lōd ˌshift·iŋ }

load stabilization *See* load compensation. { 'lōd … shən }

loadstone *See* lodestone. { 'lōd,stōn }

load stress [MECH] Stress that results from a … gravitational load. { 'lōd ˌstres }

load water [PETRO ENG] Water used to prime a … acidizing procedure. { 'lōd ˌwȯd·ər }

load waterline [NAV ARCH] The waterline of a fl… vessel. { 'lōd 'wȯd·ərˌlīn }

load water plane [NAV ARCH] The water plan… loaded vessel. { 'lōd 'wȯd·ər ˌplān }

loam [GEOL] Soil mixture of sand, silt, clay, … [MET] Molding material consisting of sand, silt, an… over backup material for producing massive castings … iron or steel. { lōm }

loaming [GEOCHEM] In geochemical prospecting … in which samples of material from the surface m… traces of a sought-after metal; its presence on the … sumably indicates a near-surface ore body. { lōm… }

LOB *See* line of balance.

Lobachevski geometry [MATH] A system of p… etry in which the euclidean parallel postulate fails: … not on a line L has at least two lines through it … Also known as Bolyai geometry; hyperbolic geom… bə'chef·skē jē'äm·ə·trē }

lobar pneumonia [MED] An acute febrile disea… one or more lobes of the lung, usually following … infection. { 'lō,bär nù'mō·nyə }

lobar sclerosis [MED] Neuroglial proliferation … by atrophy of a cerebral lobe leading to mental and … deficits; most common in infants and children who … prolonged hypoxia. { 'lō,bär sklə'rō·səs }

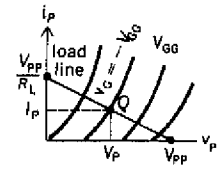
Lobata [INV ZOO] An order of the Ctenophora … body is helmet-shaped. { lō'bād·ə }

lobate [BIOL] Having lobes. [VERT ZOO] Of … the skin of the fin extend onto the bases of … { 'lō,bāt }

lobate rill mark [GEOL] A flute cast formed by … { 'lō,bāt 'ril ˌmärk }

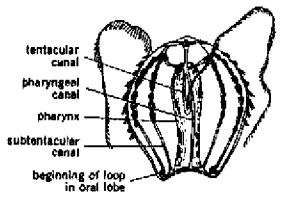
lobe [BIOL] A rounded projection on an organ … [DES ENG] A projection on a cam wheel or a … wheel. [ELECTROMAG] A part of the radiation … directional antenna representing an area of strong … transmission. Also known as radiation lobe. [… portion of the directivity pattern of a transducer … area of increased emission or response. [HYD] … jection on the margin of a continental ice sheet …

LOAD LINE



Load line drawn across characteristic curves giving plate current, i_P, as function of plate voltage, v_P, for various values of grid supply voltage, V_{GG}. V_{PP} = plate supply voltage, R_L = load resistance, v_G = grid voltage. Quiescent point, Q, determines quiescent plate current, I_P, and quiescent plate voltage, V_P.

LOBATA



Bolinopsis mikado.